School Improvement Specialist Training Materials: Performance Standards, Improving Schools, and Literature Review

Module 4— Effective Teaching

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The School Improvement Specialist Project prepared seven modules. School improvement specialists, as defined by the Appalachia Educational Laboratory at Edvantia, are change agents who work with schools to help them improve in the following areas so as to increase student achievement. These modules are intended to provide training materials for educators seeking professional development to prepare them for a new level of work.

Module 1—Shared Leadership
Module 2—Learning Culture
Module 3—School-Family-Community Connections
Module 4—Effective Teaching
Module 5—Shared Goals for Learning
Module 6—Aligned and Balanced Curriculum
Module 7—Purposeful Student Assessment

Each module has three sections:

1. Standards: Each set of content standards and performance indicators helps school improvement specialists assess their skills and knowledge related to each topic. The rubric format provides both a measurement for self-assessment and goals for self-improvement.
2. Improving Schools: These briefs provide research- and practice-based information to help school improvement specialists consider how they might address strengths and weaknesses in the schools where they work. The information contained in the briefs is often appropriate for sharing with teachers and principals; each includes information about strategies and practices that can be implemented in schools, resources to be consulted for more information, tools for facilitating thinking about and working on school issues, and real-life stories from school improvement specialists who offer their advice and experiences.
3. Literature Review: The reviews of research literature summarize the best available information about the topic of each module. They can be used by school improvement specialists to expand their knowledge base and shared with school staffs as part of professional development activities.

Effective Teaching

Content Standards and Performance Indicators for School Improvement Specialists

Self-Assessment Tool

Effective Teaching: This matrix assesses the extent to which a school improvement specialist has the knowledge and skills to assist a school in developing its capacity for effective teaching as indicated by the following kinds of teacher behaviors: (1) teachers align practice with research on effective teaching, (2) teachers actively engage students in a variety of learning tasks, (3) teachers pose questions that encourage reflection and higher-order thinking, (4) teachers expect students to think critically, and (5) teachers use teaching strategies designed to motivate students.

Knowledge or Skill	Advanced	Proficient	Basic	Novice
1. Knowing and promoting the use of research-based teaching and learning strategies	The school improvement specialist a. coaches teachers in the use of a variety of instructional strategies to meet the needs of all learners b. promotes reflective practice on the part of teachers by providing them with the skills for reflection and support in the process c. facilitates planning and implementation of different strategies, including culturally responsive teaching strategies, in classrooms across grade levels and subjects d. coaches administrators and teacher leaders in the use of research-based instructional strategies as they work with teachers to improve student performance e. facilitates classroom observations by peer or administrator teams f. coaches observers in the provision of effective feedback to observed teachers and in the facilitation of teacher reflection around observation data g. facilitates peer-to-peer debriefing sessions to share data and help plan for future action and follow-up as needed h. provides references and resources on research-based best practice to school leaders, faculty, and staff for additional information and follow-up by school staff i. ensures that teachers reflect on the extent to which their classroom instructional practices promote schoolwide improvement goals	The school improvement specialist a. understands the research underpinning effective teaching and learning, and can translate research and theory into practitioner-friendly language b. encourages the principal and other school leaders to expand their knowledge of research-based best practice and talks to them about their instructional leadership role c. shares research-based best practice—including culturally responsive teaching (see standard 9, Knowing and promoting use of culturally responsive instructional strategies)—with individual and groups of teachers and facilitates classroom use of these d. works with individuals and groups of teachers to assess the use of best-practice strategies for their specific subject areas and grade levels e. observes classrooms to assess instructional quality and counsels privately with teachers to give individualized feedback and specific plans for future action f. provides references and resources for the research base supporting effective instruction	The school improvement specialist a. is familiar with the research base supporting effective instruction, including teaching strategies that are designed for students of differing cultures and socioeconomic backgrounds (see standard 9, Knowing and promoting use of culturally responsive instructional strategies) b. encourages teachers to use a variety of instructional strategies and provides guidance in the matching of strategy to context	The school improvement specialist a. knows and is comfortable using a range of instructional strategies and is familiar with the research supporting the use of each strategy b. encourages teachers and instructional leaders to extend their knowledge base related to research-based, effective instruction c. is familiar with culturally responsive teaching strategies (see standard 9, Knowing and promoting use of culturally responsive instructional strategies) and encourages administrators and teachers to extend their understanding of this area

Knowledge or Skill	Advanced	Proficient	Basic	Novice
2. Differentiating instruction to each student	The school improvement specialist a. models and demonstrates techniques for assessing learning needs and differentiating instruction in classrooms and with teams of teachers b. coaches teachers in the use of differentiated instruction with their students c. works with administrators and teachers to facilitate planning for the use of differentiated instruction across subject areas d. helps staff find additional research or other resources to improve the use and/or effectiveness of differentiated instructional practices	The school improvement specialist a. shares strategies and best practices for assessing learner needs and adjusting instruction accordingly in workshops and other professional learning settings b. works with individuals or teams of teachers to plan for effective differentiation of instruction within their subject areas	The school improvement specialist a. provides resources, including reference material, to teachers describing best practices for differentiating instruction b. talks with teachers about specific strategies that may be effective in meeting the needs of different types of learners in their classrooms	The school improvement specialist a. is familiar with literature and research on the differentiation of instruction to accommodate students' different learning needs b. talks with teachers and instructional leaders about the need to differentiate instruction
3. Engaging and motivating students in classrooms	The school improvement specialist a. has knowledge of a variety of age-and grade-appropriate strategies to engage and motivate learners (e.g., student-centered activities, hands-on activities, activities related to students' life experiences) b. shares the research and literature supporting the use of strategies for motivating and engaging students with faculty and staff c. models and demonstrates these strategies and facilitates teachers' planning and use of the strategies in their own classrooms d. coaches teachers in the use of motivational strategies and facilitates feedback sessions with individuals and groups to refine and expand the use of practices to motivate and engage all learners	The school improvement specialist a. regularly consults with teachers in the use of strategies for engaging and motivating learners in the classroom environment b. provides research-based information about and/or demonstrates motivational strategies in workshops or professional development sessions c. demonstrates motivational strategies in classrooms d. works with individuals or groups of teachers to provide resources and develop plans for using engagement and motivation strategies in their classrooms	The school improvement specialist a. is knowledgeable of and comfortable using strategies to engage and motivate learners and employs these strategies in workshops or professional development sessions, as appropriate b. provides teachers with strategies and resources for engaging and motivating their students c. talks with instructional leaders about schoolwide policies and practices affecting student motivation	The school improvement specialist a. is familiar with strategies to engage and motivate learners and with research and literature supporting the use of these strategies

Knowledge or Skill	Advanced	Proficient	Basic	Novice
4. Assessing instructional impact	The school improvement specialist a. has extensive knowledge of a variety of formal and informal techniques for assessing instructional impact and mentors school leaders in appraising the current status of assessment practices across the school and in developing plans for improvement b. coaches teachers in the use of assessment results to individualize instruction and improve learning for all students c. encourages administrators and school leaders to establish peer assessment teams (i.e., grade level or disciplinary) to collaboratively examine student work and achievement d. provides administrators and staff with extensive resources related to assessment techniques and encourages continuous reflection on the use of assessment to improve learning for all students	The school improvement specialist a. regularly discusses and demonstrates various methods for assessing instructional impact b. helps teachers understand the importance of assessment in individualizing instruction and improving student learning through formal presentations and informal sharing c. provides specific plans and resources to individuals and groups of teachers for use in assessing the impact of their own instruction	The school improvement specialist a. is proficient in the use of a variety of practices and methods for assessing instructional impact b. provides resources to teachers for use in planning assessments c. describes and demonstrates alternative approaches to instructional assessment	The school improvement specialist a. knows the value of assessing instructional impact b. is familiar with several different methods of assessment c. talks with teachers and administrators about the importance of assessment
5. Collaborating with peers to plan and teach lessons	The school improvement specialist a. mentors administrators and teacher leaders in the development of a collaborative work culture b. consistently models a commitment to the principles of collaboration c. coaches school leaders and teachers in the use of collaborative skills and practices d. works with school leadership to develop schoolwide structures that institutionalize and support teacher collaboration	The school improvement specialist a. provides research-based training in the skills and culture underlying teacher collaboration b. engages teachers in the development of collaborative work groups for lesson planning and assessment c. facilitates collaborative planning and assessment of instruction by teams of teachers	The school improvement specialist a. has knowledge of the skills and culture underlying teacher collaboration and shares this knowledge in professional development sessions and workshops b. encourages administrators to foster an atmosphere for collaboration and peer-reviewed practice	The school improvement specialist a. knows the importance of teacher collaboration for instructional improvement b. encourages teachers to work in teams

Knowledge or Skill	Advanced	Proficient	Basic	Novice
6. Integrating technology into instruction	The school improvement specialist a. is knowledgeable about many technologies used in classroom settings and provides interactive training on integrating technology into the specific instructional contexts b. engages faculty and school leadership in ongoing discussion of the status of technology integration in the school c. facilitates the development of support structures to institutionalize technological integration	The school improvement specialist a. is knowledgeable about many different technologies used in classroom settings and demonstrates their use to school staff b. provides individual or group training on integrating technology into teachers' specific instructional contexts	The school improvement specialist a. has knowledge of a wide range of current technologies and how to integrate them into instruction b. shares knowledge of technology integration with faculty and staff in professional development sessions and individual interactions	The school improvement specialist a. is aware of current technologies and their use in instruction b. is comfortable using some technological devices and software for classroom instruction
7. Grouping strategies for maximum student achievement	The school improvement specialist a. models grouping strategies in professional development sessions with staff and explicitly demonstrates the role teachers should play during student group work b. coaches teachers in the development of plans and selection of strategies for grouping students to increase learning and achievement c. facilitates teacher planning for challenging and meaningful group work and assessment d. provides resources and strategies for encouraging cooperation rather than competition and for creating a comfortable environment for student interaction and discussion e. mentors the principal and other instructional leaders in understanding the value of cooperative groups and in recognizing effective use of groups f. describes the importance of heterogeneity in learning groups, including (as feasible) groups of varying ability levels, special-needs students, or English language learners (ELL)	The school improvement specialist a. shares specific strategies, plans, and ideas for grouping students in classrooms b. engages teachers in reflection and dialogue about issues related to effective use of groups for student learning c. provides sample rubrics and other assessment/evaluation tools that teachers can adapt to assess cooperative group products and learning	The school improvement specialist a. provides teachers with information about the effects of student grouping on learning and achievement b. instructs teachers in the principles and practices of effective grouping	The school improvement specialist a. is familiar with literature detailing the effects of various types of grouping strategies on student learning and achievement

Knowledge or Skill	Advanced	Proficient	Basic	Novice
8. Understanding and using effective questions and questioning strategies	The school improvement specialist a. knows the research that relates effective questions and questioning to high levels of student thinking and learning (i.e., achievement) b. models the use of effective questioning strategies in all interactions with school staff c. coaches teachers in the effective use of questioning strategies (e.g., wait times, cueing, probing, appropriate feedback) d. communicates research relating questioning to student achievement to school leaders and faculty e. knows and models strategies for engaging all students in answering questions and for promoting equitable response patterns f. knows and uses the revised Bloom's Taxonomy as a tool to promote higher level responses and questions from students g. values and facilitates engagement of students in asking questions as a tool for their own learning	The school improvement specialist a. understands the value of effective questioning strategies for student learning and is familiar with research supporting such strategies b. demonstrates effective questioning strategies during professional development sessions or workshops c. works with individuals or groups of teachers to provide specific strategies and guidelines for use in their classrooms d. is familiar with the revised Bloom's Taxonomy and how to use it in the promotion of higher level thinking	The school improvement specialist a. recognizes the value of effective questioning to improve student thinking and learning b. promotes the use of effective questioning strategies in conversations with school staff c. shares specific strategies for questioning and eliciting student responses	The school improvement specialist a. knows the value of quality questioning to improve student learning and engagement b. knows some strategies for good questioning
9. Knowing and promoting use of culturally responsive instructional strategies	The school improvement specialist a. knows the literature that relates to achievement gaps and strategies for closing those gaps b. values the cultures and beliefs of school staff and students and incorporates those cultures into personal and professional interactions c. models the use of culturally responsive instructional strategies (e.g., expressing high expectations, active teaching, learner-controlled discourse) in all interactions with school staff d. encourages and facilitates the improvement or development of a culturally relevant and challenging curriculum by administrators and school leaders e. facilitates and supports administrators' institutionalization of culturally responsive instructional practices throughout the school	The school improvement specialist a. consistently promotes the use of culturally competent instructional strategies as vital tools for reaching all students b. works with individuals or groups of teachers to provide research-based strategies and tools (e.g., active teaching, student-controlled discourse) for teaching students of differing ethnicities and SES backgrounds c. works with administrators and school leaders to plan a relevant and challenging curriculum to capitalize on students' differing backgrounds and strengths	The school improvement specialist a. recognizes and promotes the value of culturally competent instruction for reaching students of different ethnic and SES groups b. provides to school staff some resources and research-based techniques for teaching students of differing ethnicities and SES backgrounds	The school improvement specialist a. has a basic understanding of cultural competence and its importance for teaching students of different ethnic/SES groups b. is familiar with some literature addressing techniques for closing achievement gaps

An Overview

Art or science? Innate or learned? What is good teaching and how do you recognize it?

While the scope of this document prevents us from thoroughly explicating the topic, we do explain some activities that might be deemed "effective teaching" by most educators. The articles included are grounded in recent research and literature, particularly that addressing *high-quality instruction.*

The following topics are addressed in short, research-based articles and stories from teachers and school improvement specialists:

- using a variety of instructional strategies
- collaborative planning and coaching
- motivating students and nurturing student responsibility
- helping students collect and reflect on student work samples
- learning from the analysis of student work samples
- grouping students for instruction
- effective questioning
- using culturally responsive instruction
- differentiating instruction to meet learner needs

This list is not exhaustive and many other valuable practices are addressed in other modules of this school improvement specialist training.

The intention of the authors is that you will know how and when to employ the strategies described here to best meet the needs of the educators with whom you work and their students. Skillful School Improvement Specialists, like skillful teachers, understand that positive change depends on knowing your target.

> The act of teaching is a holistic endeavor. Effective teachers employ effective instructional strategies, classroom management techniques, and classroom curricular design in a fluent, seamless fashion.
>
> —Robert Marzano, *What Works in Schools: Translating Research into Action*

Inspiration and contributions for Improving Schools *came from Edvantia staff and school improvement specialists with whom we work. These resources have been created to support school improvement specialists and the schools they assist.*

Effective Instruction—An Operational Definition

Teachers who strive for effectiveness couple repertoire with experience to

- articulate the learning goals
- recognize and diagnose the needs of each learner (with assistance from specialists, as needed)
- select or develop appropriate strategies to address needs of individual learners
- create an environment rich in learning resources
- group students for effective learning in varied contexts
- assess accurately each learner's knowledge, skills, and values
- analyze assessment results and appropriately adjust curriculum and instruction

Perhaps the most critical of these tasks are implementing appropriate instructional strategies and selecting alternatives when the strategies appear not to be working for some individuals.

In his 2003 review of the literature and compilation of recommendations about effective instruction, Robert Marzano advocates an instructional framework. According to Marzano, this framework should incorporate strategies that are used at regular intervals. These strategies focus on input experiences (assessing previous knowledge about the content, providing links to that knowledge, suggesting organizational frameworks for the content) and deal with reviewing, practicing, and applying content.

Marzano's general instructional categories reveal the complexity of effective teaching. They highlight nine areas and outline specific behaviors within each that have been shown by research to relate to student achievement.

1. identifying similarities and differences
2. summarizing and note taking
3. reinforcing effort and providing recognition
4. homework and practice
5. nonlinguistic representations (mental images, pictures, graphs, models, acting out content, etc.)
6. cooperative learning
7. setting objectives and providing feedback
8. generating and testing hypotheses
9. questions, cues, and advance organizers (pp. 82-83)

As elementary classes become departmentalized so less of the day's teaching is conducted by one teacher, and high school schedules become "blocked" so more minutes are organized by a single teacher, the types of school days teachers were originally trained for are becoming scarce. Today's teachers need to be equally facile with all nine of Marzano's categories of instructional strategies.

Teachers also need to know how to engage students in learning, to help students understand their own learning preferences and abilities, and to reflect on their work. You can read more about these topics elsewhere in this publication.

Reference

Marzano, R. J. (2003). *What works in schools: Translating research into action.* Alexandria, VA: Association for Supervision and Curriculum Development.

Student Motivation and Engagement

What would researchers observe to verify that students are motivated and engaged in classroom learning activities?
What are disengaged classroom behaviors?
How do teachers influence motivation and student engagement?

The National Board for Professional Teaching Standards (NBPTS) seeks to identify and recognize teachers who effectively enhance student learning and demonstrate high levels of knowledge, skills, abilities, and commitments reflected in five core propositions. Within these core propositions the board asserts that teachers

- understand how to motivate students to learn and how to maintain their interest even in the face of temporary failure
- understand the ways in which students can be motivated and have strategies to monitor student engagement
- know how to engage groups of students to ensure a disciplined learning environment
- place a premium on student engagement (NBPTS, 2005)

It's interesting to see what students have to say about activities they consider engaging. When a sample of high school students participated in focus group discussions, they were definite about what motivates them to learn and participate in classroom activities (Walsh & Sattes, 2000). Here are some sample responses:

- I like to be active.
- I really like hands-on activities.
- It is important to have a good relationship with my teacher before I really want to pay attention and learn.
- Students need to be clear about what is expected of them.
- Kids are motivated by teachers who find clever ways to make teaching and learning fun.
- When teachers mix up their teaching styles, they reach more kids.
- When teachers help relate an assignment to real life, I am more motivated.

- When teachers get to know students, students are more inclined to learn. Teachers and students need to be more connected.

Many factors affect a student's level of motivation, and not all students will be motivated in the same ways at the same time. No one can motivate another person, but a master teacher can create the conditions for learners to find that motivation within themselves.

In creating these conditions, teachers need to consciously address the following elements of lesson/unit design:

- relevant and meaningful content (interest)
- appropriate level of challenge
- feedback (knowledge of results)
- students' level of concern
- students' chance for success
- task as the reward (intrinsic vs. extrinsic motivation)
- opportunity for collaboration
- choice (autonomy in learning) (Crotty, 1993)

David Strahan reviewed studies that identified patterns leading to the most gains in achievement. Two of the three dynamics he identified as significant relate to engagement:

1. Academic engagement is the primary path to achievement. Wang, Haertel, and Walberg conclude from their analysis of multiple variables related to student achievement that the most important factor is "maintaining active participation by all students."
2. Teacher quality is essential to promote engagement and achievement. Strahan consults research by Sanders and Horn, which suggests that "race, socioeconomic level, and class size are 'poor predictors of student academic growth' and that the major determinant of academic growth is the quality of the teacher" (2003, p. 298).

William Glasser (1990) theorizes that in addition to survival needs, human needs include love and belonging, fun, freedom, and power (competence, skills, worth). Students whose teachers support these needs are more likely to be motivated to engage in learning activities.

Parish and Parish suggest that teachers can support these needs in their classrooms by

- encouraging a sense of belonging by developing a caring attitude and classroom atmosphere

- instilling in their students a sense of power as they acquire new knowledge, skills, and competencies
- allowing freedom of opportunity to learn in different ways
- providing "fun" activities, operationally defined as lessons that provide immediate satisfaction of our need for love and belonging, power (competence, skills, worth), or freedom
- becoming a friend to their students, someone who is approachable and "helps you to like yourself" (2001, pp. 201)

Factors that affect student motivation include interest in the subject matter, perception of its usefulness, general desire to achieve, self-confidence and self-esteem, as well as patience and persistence. And, of course, not all students are motivated by the same things.

Based on psychological studies, Purkey and Novak (1984) contend that

> rather than struggling to motivate students, the teacher may assume that they are *always* motivated. Thus the teacher can concentrate his or her energies toward influencing the direction this motivation will take. The student's motor is already running. The function of education is to place the signs, build the roads, direct the traffic, and teach good driving—but not to *drive* the car. (p. 31)

Most students respond positively to a well-organized course taught by an enthusiastic instructor who has a genuine interest in students and what they learn. Thus, activities you undertake to promote learning will also enhance students' motivation (Davis, 1993).

Reflection

- Running through the student responses presented here is the theme of connectedness: with content, with one's peer group, and between teacher and learner. What kinds of instructional practices promote connectedness and thereby provide internal motivation?
- Create a rubric that could be used for a classroom observation protocol and that addresses motivation and engagement.
- Can good teachers motivate students, or do they create the conditions that stimulate students' internal motivations? Explain.

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School Stories: Motivation and Engagement

Ask Susan Lenhart's students at Central High, and they will probably talk about their oral history project. Inspired by the *Foxfire* project, Lenhart realized the power of this approach for her students in her small rural community. She sees oral history as an avenue that "gives voice to her [students'] expression" and believes that central to the success of this project is her encouragement of students "to pick a topic they can *connect* to." She takes obvious pride in the transformation of Sarah, a junior who selected her father as the subject of her project. Sarah found out things that she never knew about her father—most poignantly his experiences during the Vietnam War. In her reflection about the work she did over time on this project, Sarah concluded: "My father now shapes and molds who I am by the way he acts. I watch him and try to act with the same passion for life as he does. My father is a role model for any person, and he is the person I look to for guidance and encouragement." Not only was this learning experience inherently motivating for Sarah and her peers, its residual value was also potent. These students have a new appreciation for the relationship between "book learning" and real life.

On the last day of school, students at Natcher Elementary School are actively engaged in learning. However, they are not sitting in their desks straight-in-a-row; rather, they are circled on the floor. Some are stretched out on their sleeping bags; others are sitting cross-legged in front of actual tents. These students are participating in Camp Learned-A-Lot, an annual event celebrating (and reviewing) the learnings of the school year. This somewhat unorthodox approach ("a new way to do an old thing") succeeds in engaging and motivating these kids until the last bell of the year rings.

Excerpted from *Inside School Improvement: Creating High Performing Learning Communities* by Jackie A. Walsh and Beth D. Sattes. Charleston, WV: AEL, 2000, pp. 196-197.

Reflection

- What examples of connectedness do you find in the school stories?
- Speculate on how the students at Natcher Elementary may have spent their time during Camp Learned-A-Lot. How would students demonstrate their learnings?

> Whatever level of motivation your students bring to the classroom will be transformed, for better or worse, by what happens in that classroom.
>
> —Barbara Gross Davis, *Tools for Teaching*

Using Effective Questioning

In the average classroom, more than 40% of instructional time is devoted to asking and responding to questions (AEL, 1994; Gall, 1971). Questioning is a powerful tool for teachers at all grade levels and in all disciplines. Good questions, effectively delivered, can facilitate student learning and help measure how well students are mastering content.

The work of numerous education researchers (for example, Hamaker, 1986, and Walberg, 1999) documents the link between effective questioning and increased student learning. However, classroom practice has remained relatively unchanged over 100 years of research and observation. Research shows that what actually takes place in the classroom falls far short of the ideal. Let's look at a few examples.

- **Wait Time I** (the time period immediately following a teacher's question). Teachers usually require students to respond almost instantaneously, allowing less than one second to process the question and think through the answer before calling on another student. However, in classrooms where teachers wait three to five seconds, students give longer responses, answer more frequently at higher intellectual levels, demonstrate more confidence in their answers, and ask more questions to clarify understanding (Barnette et al., 1995; Hunkins, 1995; Rowe, 1986; Tobin, 1987).

- **Wait Time II** (the time period immediately following a student's answer). Usually, teachers react immediately to a student's response, waiting an immeasurably short amount of time before providing feedback or making another instructional move. In classrooms where teachers wait three to five seconds after the initial student response, students answer more completely and correctly, consider responses and draw more conclusions, ask more questions, increase interactions with other students, and demonstrate more confidence in their responses (Barnette et al., 1995; Hunkins, 1995; Rowe, 1986; Tobin, 1987).

- **Asking questions at all cognitive levels.** Research shows that about 75 to 80% of the questions posed in elementary and secondary classrooms are at the knowledge, or recall, level—the lowest cognitive level. However, when students have opportunities to answer higher-level questions, they show an ability to analyze, summarize, and evaluate; they also score better on tests that measure recall and understanding of that content (Gall, 1984; Marzano, Pickering, & Pollock, 2001; Redfield & Rousseau, 1981).

- **Redirecting questions.** Teachers typically answer their own questions when students do not answer immediately or do not give the answer the teacher seeks. However, when teachers pose a question to multiple students, students are held more accountable for answering all questions; additionally, the interactions among students increase (Ornstein, 1988).

- **Calling on a student.** Teachers frequently call on a student to answer a question before posing the question, so other students never formulate a response. However, when teachers pose questions before calling on a student, all students are more likely to pay attention to the question and mentally prepare a response (Barell, 2003; Johnson & Johnson, 1985).

- **Repeating students' answers.** Teachers typically repeat students' answers; however, when teachers do not repeat answers, students pay greater attention to show increased respect for their classmates' responses (Walsh & Sattes, 2005).

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School Stories

Questioning and Understanding to Improve Learning and Thinking, or QUILT, is an Edvantia professional development program that helps teachers develop quality questioning skills. Educators at schools that have adopted the program offer praise and feedback in the brief stories printed here. For more information, visit www.edvantia.org/quilt.

Using QUILT in the Foreign Language Classroom

The knowledge and practice of QUILT behaviors help to establish a classroom atmosphere where every student is expected to participate. No one is "off the hook," and questions are distributed equitably. The seating arrangement of the students is adapted to facilitate communication, and alternative response formats are utilized to enhance participation. Perhaps the most valuable QUILT behaviors in the foreign language classroom are those of Wait Time I and Wait Time II. Each student is expected to develop a covert answer for a teacher-posed question. If, as students are called on for their responses (in the foreign language), the teacher provides time for the students to think, their responses become more detailed, more personal, and more relevant. Students who are given Wait Time II instead of immediate affirmation of a correct response will often add to it. Other

> students may piggyback off the initial student response (again, in the target language) resulting in authentic communication.
>
> —Marion Thompson, Teacher, Lumberton (NC) Senior High School

Using QUILT in High School

> Asking questions is as much a part of the modern classroom as chalk dust was of earlier ones. Teachers should be master question makers and askers. But, like so many assumptions about our profession, guess what? We're lousy at question making and worse at asking. It took the QUILT experience to show our faculty that much needed to be done in this foundational aspect of our jobs. Understanding that most teachers rarely move beyond the basic level of thinking in their question formulation was a revelation of no mild significance. I knew, once upon a time, that Bloom's taxonomy was important if I wanted to ensure that my students were thinking at higher levels. I believe that idea got lost along the time of the Challenger disaster, or was it about the time my 16-year-old came along? It may have been forgotten the day I became a principal. Could be! Our job is to plan for our students' success by learning to ask educative questions in as many ways as possible.
>
> —John S. Bell, High School Principal, Saint James School, Montgomery (AL)

On the Job: Improving Instruction Through Feedback and Reflection

The school improvement specialist stories that appear in Improving Schools *come from real life. The names have been changed or removed to preserve confidentiality.*

As the school improvement specialist in a school where teachers had potential but many problems, I wanted to offer specific feedback on instruction, but I also wanted the teachers to experience the power of personal reflection and dialogue. I began to use a process known as PQP, or praise-question-polish.

The process goes like this: After a classroom observation, the observer completes a PQP form that outlines praises, questions, and polishes for the teacher. The teacher also has the opportunity to complete the same form about the lesson. The observer's form merely guides thoughts and refreshes memory for a post-class conference; the teacher's form guides his or her reflection about the class.

I ran into problems the first day. Teachers in this school were overloaded with administrative paperwork and saw my PQP form as just another mindless task. They specifically told me, "I don't have time to write all this stuff down." I decided to alter the PQP format to meet my needs.

After arranging to observe a class, I asked the teacher what aspect of the class he would like me to observe. A bit taken aback that I did not have something specific in mind, he said he would like to improve his classroom management skills. I told him that would be the focus of my observation. I then gave him a copy of the teacher PQP form and told him he could complete it if he wished but was not required to do so. I would not use it for any reason; it was for his use alone. I made an appointment for the observation and the follow-up conversation.

Because the teacher was nervous, I did not write anything during my observation. When I arrived for the follow-up conversation, I did not bring any written material. He had completed his form, although it was very sketchy. The entire conversation centered on his observations about his own teaching and classroom management. Although he had written very few notes, he remembered exactly what had happened. The PQP format enabled him to think through various scenarios and reflect on their effectiveness.

I used the teacher's comments to offer coaching questions that enabled him to make a plan for improvement. At the end of the session, he asked me for suggestions to improve his classroom management. I responded that he had crafted his own plan. My job was merely to lead him a bit to discover his own expertise.

Word spread. Teachers slowly began asking me to observe their classes. Most did not complete the form, but all knew what the form looked like, and all knew they would have the chance—in a safe environment—to reflect on their practice and plan for improvement.

In using PQP, I've learned many things. Many teachers do not want to do a written report of their work. Although the act of written reflection is valuable and powerful, teachers can and do reflect from memory. As teachers become more comfortable with the process, I find I can suggest that a written reflection will enhance their experience.

Once I establish a level of trust, the teacher is more comfortable with my writing in the back of the classroom, but I've learned to do my best not to take notes during the class observation. As soon as the class is over, I make time to jot down copious notes before I forget what happened.

Semantics make a difference. I no longer refer to "feedback sessions" but instead schedule less threatening "follow-up conversations."

I've learned that asking leading questions is more powerful than giving outright advice. When I encounter a teacher with real difficulties who may not be able to generate solutions, I ask, "Would you like to know what some other teachers have done in a similar situation?" The answer is always yes, giving me permission to offer advice.

Sometimes the teacher does not approach the most salient instructional problem in an observed lesson. I've learned to help the teacher with the polish he or she wants to work on, even if I would prefer to take another tack. Working with the teacher's immediate concerns builds trust and credibility, opening doors for me to introduce other instructional issues.

Occasionally I work with a teacher who is hopelessly lost, usually a first-year teacher desperate for assistance who asks for specific help. Together we highlight two or three areas where the teacher feels most overwhelmed, then schedule observations to look at these areas, brainstorm specific suggestions, offer resources, and provide emotional support. Although these teachers are truly overwhelmed, most of them take the time to complete a PQP form once they experience its value.

Will I continue using PQP? The value of the process became crystal clear one day when a teacher stopped me in the hall and said, "I need us to PQP about my graphic organizer on mitosis and meiosis. Are you available third period?" I realized the term had become institutionalized and that teachers were even using it as a verb! I mentally danced a joyful jig as we made the appointment.

> Unfortunately, there is no single magical formula for motivating students. Many factors affect a given student's motivation to work and to learn (Bligh, 1971; Sass, 1989): interest in the subject matter, perception of its usefulness, general desire to achieve, self-confidence and self-esteem, as well as patience and persistence. And, of course, not all students are motivated by the same values, needs, desires, or wants. Some of your students will be motivated by the approval of others, some by overcoming challenges.
>
> —Barbara Gross Davis, *Tools for Teaching*

Collaborative Examination of Student Work

Habit and tradition cause teachers to spend a lot of time studying what to teach, but curiosity, fascination, and the desire to grow professionally bring us together to study what we have taught and what students have learned. We teachers who are learners are hungry for the kind of discussions we can have when student work is the focus. We work together like an artists' colony, considering our craft and our materials, the quality of the process and the product, generating ideas about how to make our work better (Nolan, 2000).

Student work is the most tangible artifact of the teaching craft. Rich work samples can show us how students are thinking, the fullness of their factual knowledge, and the connections they are making with the content. Talking about the work with our colleagues can help us become accountable and learn how to adjust instruction to meet the needs of our students. Fruitful study of student work requires a well-conceived

process, dedicated colleagues willing to take risks, and open minds and hearts seeking to move ahead.

Practices for looking at student work include structured conversations, sometimes called protocols, for collaborative inquiry and reflection. In a protocol, teachers meet in a group led by a facilitator and follow a prescribed set of steps. The steps might include presentation of a focusing question, close examination of student work, description of the work, clarification by questioning, feedback to the presenting teacher, and reflection on the process. Some protocols emphasize evaluation—analyzing effectiveness of curriculum, instruction, or assessment practices; others emphasize description to heighten teachers' understanding of individual children. Whatever the style, the protocol's goal is to affect teacher practice.

A protocol consists of guidelines for a conversation, and this structure—which everyone understands and agrees to—permits a certain kind of conversation to occur, often a kind of conversation that people are not in the habit of having. Protocols promote the skills and culture necessary for collaborative work. Thus, using protocols often helps groups build trust by doing substantive work together.

Choosing and practicing the right protocol for looking at student work depends on your purposes for looking.

Eric Buchovecky describes a collaborative process adapted from Mark Driscoll at the Education Development Center and Steve Seidel and others at Harvard University's Project Zero. The piece lays out useful reminders for how participants can focus on the evidence and listen to multiple perspectives (Coalition of Essential Schools, 1996). Those norms are summarized here:

When looking for evidence of student thinking,

- stay focused on the evidence that is present in the work
- look openly and broadly; don't let your expectations cloud your vision
- look for patterns in the evidence that provide clues to how and what the student was thinking

When listening to colleagues' thinking,

- listen without judging
- tune in to differences in perspective
- use controversy as an opportunity to explore and understand each other's perspectives
- focus on understanding where different interpretations come from
- make your own thinking clear to others
- be patient and persistent

When reflecting on your own thinking,

- ask yourself, "Why do I see this student work in this way? What does this tell me about what is important to me?"
- look for patterns in your own thinking
- tune in to the questions that the student work and your colleagues' comments raise for you
- compare what you see and what you think about the student work with what you do in the classroom

When you reflect on the process of looking at student work, ask these questions:

- What did you see in this student's work that was interesting or surprising?
- What did you learn about how this student thinks and learns?
- What about the process helped you see and learn these things?
- What did you learn from listening to your colleagues that was interesting or surprising?
- What new perspectives did your colleagues provide?
- How can you make use of your colleagues' perspectives?
- What questions about teaching and assessment did looking at this student's work raise for you?
- How can you pursue these questions?
- Are there things you would like to try in your classroom as a result of looking at the student's work?

We study student work together because we learn more with other practitioners than we do alone. We study it because the proof of the teaching and learning is in the work our students produce. Standards are dull statements until we call them to life by letting student work show us the standards we are using (Nolan, 2000).

How to Get Started

- Collect two to four samples from students at different levels. Select samples that demonstrate authentic student responses to the project or task. Work may include final products, drafts, reflections, etc.
- Remove student names from samples (if possible).
- Provide context along with student work samples. Gather relevant documents that will help participants understand the project or task (e.g., assignment, scoring/grading criteria or rubrics, models, timelines, checklists, etc.).
- Provide copies of the student work for everyone. If original work (e.g., piece of artwork, complete portfolio) is the focus, let the facilitator know in advance to think about the format for presentation.
- If applicable, include a videotape, audiotape, and/or photographs of students working, performing, or presenting their work. Keep the presentation brief; usually 5 minutes is sufficient. This might be particularly useful with the work

of young children who haven't yet acquired sophisticated written communication skills.
- Be prepared to give a brief (15 minutes.) description of the context for the student work, including objectives, assignment, time and organization of task/project, and scoring criteria.

Prepare a *focusing question* about the work (e.g., Do the samples provide evidence of analytical writing?). Questions typically focus on either *inputs* (the assignment, teacher's support of student performance) or *outputs* (the quality of student work, teacher's assessment of the work).

Reflection

- Who is involved in alternative ways of looking at student work?
- Why use a protocol for looking at student work?

References

Coalition of Essential Schools. Guidelines for learning from student work. *Horace, 7,* 7-8.

Nolan, Kate. (2000). *Why is looking at student work important?* Providence, RI: Annenberg Institute for School Reform. Available from http://www.philaedfund.org/slcweb/prolog.htm

On the Job: Looking at Student Work

The school improvement specialist stories that appear in Improving Schools *come from real life. The names have been changed or removed to preserve confidentiality.*

The weekly grade-level meetings at the middle school where I was a school improvement specialist were often devoted to discipline or other issues that could be handled in another manner. To create focus on teaching and learning, I wanted the teachers to know how to examine student work. After outlining a process to the leadership team and getting their buy-in, we set aside a half day of professional development to learn the process.

I began with a PowerPoint on Phillip Schlechty's ideas in *Working on the Work*. In a strong, interactive session, we learned the rationale for examining student work—to provide students with assignments that are engaging and challenging, to pinpoint an issue with a particular student, to provide support and encouragement to teachers, and to share teaching strategies across the curriculum.

I then specifically taught the steps for the model we would use—the Collaborative Assessment Conference (CAC) from Steve Seidel and colleagues at Harvard's Project Zero. I arranged for a teacher from another school to present some student work so my

teachers could experience the process with a real student product. The effect was immediate and powerful. Teachers began to buzz with ideas for using student work.

Building on the initial enthusiasm, we scheduled teachers to share student work at the grade-level meetings. The offerings varied, but teachers began to concentrate on providing assignments that challenged their students, related the learning to the real world, and were truly engaging.

Our next step was to relate the student work to specific state standards. I did not want teachers to become so enchanted with providing stimulating work that they lost track of the standards they were charged with teaching. The teachers were impressed that one excellent assignment could address several standards, positively engage students, and eliminate many discipline problems. In addition, the standards posted in the classroom, along with the daily objective, made a critical point to students regarding their learning.

One of the great benefits was the improved practice I saw in individual teachers. Some teachers had a hard time designing truly engaging assignments; but with time, practice, and support from their fellow teachers, their presentations improved, often dramatically. Teachers learned from one another as they reflected on ways to use a particular activity or strategy in other subject areas. Furthermore, the reflection built into the CAC offered a weekly opportunity for all teachers to improve their practice. Teachers began to use rubrics for scoring. They began to attempt alternative assessment practices. They used graphic organizers in ways they had never thought about before.

Over time, another powerful benefit emerged: the teacher teams developed a professional closeness and camaraderie I would not have expected. What caused this closeness? As one teacher told me, "We're a true team now. We help each other and share everything. We actually see what goes on in the other classes."

Reflection

- The school improvement specialist first invited a teacher from another school to present student work, then scheduled teachers in her school to share student work at grade-level meetings. In what ways did this approach honor what we know about supporting individuals through the change process?
- What benefits do you think resulted from the innovation introduced by the school improvement specialist?

References

A description of the Harvard Project Zero Collaborative Assessment Conference is available online at (2002), http://www.smallschools project.org/PDFS/cac.pdf.

Phillip Schlechty. *Working on the work: An action plan for teachers, principals, and superintendents.* San Francisco: Jossey-Bass.

Recommended Reading: Differentiated Instruction

Differentiated Instruction: One Size Doesn't Fit All by Gayle H. Gregory and Carolyn Chapman, 2002, Thousand Oaks, CA: Corwin Press, Inc.

What is it? Why do we use it? How do we do it? These purposeful questions characterize the format of each section of this teacher-friendly resource. *Differentiated Instruction: One Size Doesn't Fit All* could be six books if the authors had chosen to more fully elaborate on the strategies described in the six chapters:

- Creating a Climate for Learning
- Knowing the Learner
- Assessing the Learner
- Adjusting, Compacting, and Grouping
- Instructional Strategies for Student Success
- Curriculum Approaches for Differentiated Classrooms

According to Gregory and Chapman, "Differentiated instruction gives a variety of options to successfully reach targeted standards. It meets learners where they are and offers challenging, appropriate options for them in order to achieve success" (p. x). Following this operational definition and a brief rationale for using differentiation, both contained in the Introduction, the authors briefly describe strategies that are related to the topic of each chapter. The techniques are organized by chapter, and some are treated more extensively than others (e.g., 2 pages are devoted to authentic tasks and 2 to portfolios, but 13 are devoted to learning centers).

This 134-page resource is neither prescriptive nor sequential. While acknowledging the importance of planning in achieving a class in which differentiated strategies are used, the book focuses on providing very basic instructions for a large number of techniques.

One strength of the book is that, in most cases, the technique and tool descriptions, coupled with illustrations, are sufficient for experienced educators to "use them on Monday" with little advance preparation. A major weakness is the book's lack of thoughtful discussion about the different ways students perceive the world and the diverse challenges that confront them as they face a learning task. Both new and experienced teachers could benefit from reflecting on this topic. Likewise, it would have been useful had the authors suggested a framework for creating a differentiated class culture, one that recognizes learner diversity, celebrates individuality, and helps both teachers and students view differences as strengths rather than deficits.

That said, Gregory and Chapman employ a succinct format to provide a vast array of easily replicated approaches to the challenge of helping all students learn. Teacher copies of this resource are likely to become dog-eared and tabbed, as most techniques described are useful across grades and subjects and may be referred to repeatedly throughout the year.

Evidence of Learning: Creating the Student Portfolio

On any given day, a typical teacher navigates a sea of student responses and questions. But periodically, teachers also "drop anchor"—that is, assess to determine if learning is occurring. Looking at student work can be that anchor (Nolan, 2000).

- Does Amy understand the connection between what she is saying and the lesson we just finished?
- How does Juan's project demonstrate his grasp of the ideas?
- Has the final draft of Jamil's essay improved from the first draft?

A portfolio is a purposeful, meaningful collection of student work that tells a story about a student's development, achievements, and progress over time. Some portfolios serve primarily as showcases for student work samples, some serve as learning/instructional tools, and others are used for assessment. Some focus on product, others on process. All portfolios open windows on learning, enabling an audience to see a rich and complex view of student accomplishment supported by authentic work samples (Arter & Spandel, 1992). These living documents change and grow with their creators, who learn to take ownership and responsibility for their own learning.

There is no single correct way to develop a student portfolio. However, portfolios are not meant to include everything a student produces. Clear guidelines and examples for assembling a portfolio help students generate criteria for good work (Gibbs, 2005). Careful thought should be given about the selections to include. Questions to consider include the following:

- What kinds of tasks, problems, or assessment should be chosen?
- Who is the intended audience (e.g., teacher, student, parents, college, employer)?
- Does the work demonstrate the student's understanding of content?
- Does the work show the student's progress during a selected time period?
- When, or how often, should work samples be collected?
- Who selects the work samples—the student, the teacher, or both?

Students who have never kept portfolios will need to be taught how to select their work, reflect on it, and set goals. If teachers do not model and directly teach these activities, students are likely to handle them very superficially.

- Teach students to select work. Explain clearly the criteria for choosing work samples. If a criterion is "best work," agree on a definition of this term.
- Teach students to reflect on their work. Writing critically about their work is the key to reflection and must be done on a regular basis to be effective.
- Teach students to set goals. Show them the difference between a vague goal and one that has clearly specified steps.

- Encourage students to share their portfolios with other students, parents, and the teacher.
- Involve students in developing the criteria for selecting and evaluating work to be included in the portfolio.

Each teacher will need to determine the criteria for choosing the work to include in student portfolios. As much as possible, the work should be significant—it should show important understandings the student has gained. A well-kept portfolio mirrors the comprehension and performances of a student (Gibbs, 2005).

Types of Portfolios

Working portfolio. The work selected shows that students have achieved specific standards. Working portfolios can be used for a whole year, for specific projects, or during a grading term.

Showcase portfolio. This collection of best works showcases achievement and progress. These portfolios can be shared with parents or guardians, passed along from grade to grade, or used for college admission or employment purposes.

Cumulative portfolio. This type demonstrates the achievement of specified learning goals. It consists of documentation supported by work samples. It may also include evidence of specific content competencies or more global skills. Typically, this portfolio follows a student through his or her school career.
Source: Arter & Spandel, 1992

References

Arter, J. A., and Spandel, V. (1992, Spring). Using portfolios of student work in instruction and assessment. *Educational Measurement: Issues and Practice.*

Gibbs, H. (2005). Student portfolios: Documenting success. *Techniques: Connecting Education and Careers.* Available from http://www.talentassessment.com

Nolan, K. (2000). *Why is looking at student work important.* Providence, RI: Annenberg Institute for School Reform.

From Portfolios to Student-Led Conferences
By Alice Phillips, Teacher, Sewanee Elementary School

I have worked with student portfolios for about six years, and each year I do something a little different. This year, students organized their portfolios by subject in three-ring binders. Although binders don't accommodate actual projects and performances, there's always a written component that can be included.

Each portfolio binder begins with a section in which students include their "firsts"—math problem solving, cursive writing, geography challenge, and so on. Then every week when papers go home, students select papers to keep. My only rule is that, on each paper, students must write a statement that explains why they selected it and what knowledge or skills are demonstrated. This is still a big struggle for students—to engage in the metacognitive task of analyzing their own learning and to articulate that learning in writing.

At a summer professional development symposium, I attended a session on student-led conferences and was determined to use conferencing as a method for students to share their portfolios with their parents. By fall conference time, however, I didn't feel ready. Instead I took a step in that direction: student-participant conferences. In conferences that included students, parents, and myself, I modeled for students what I hoped they would do in the spring. I used the student portfolios to talk to parents about their children's learning and progress. Parents' responses were generally enthusiastic, with lots of appreciation for what the portfolios showed about the children and their learning.

Students reviewed their portfolios, selecting three pieces from "literacy" and two from all other subject areas. I helped students create a full-page description for each selection. We decided on four categories for discussion: best work, hardest work, most improved work, and "something I want to work on." On each page, students wrote (1) what they had learned, (2) what they were proud of, and (3) goals they wanted to set.

To ready the room, students' desks were arranged in groups of four. We covered each grouping with colored paper, put a flower on top, and we were ready!

In a letter to parents, I explained this "new" way of conferencing. I asked each to sign up for one of three time blocks: 3:00, 4:00, or 5:00. What a difference from the standard 10-minute slot! It couldn't have gone any better! Some parents stayed for 45 minutes; others were done in about 15. I greeted each family, ushered them to a table, and assured them I would come back to answer any questions.

I was able to talk to every parent who attended. No one had to wait with nothing to do. Everyone seemed pleased and the energy level was high. We had 100% attendance, including two families who couldn't attend the day of the conferences, so they came in the next day.

My opinion? The value of a portfolio is in the way it is used. I'll never do it the old way again!

Adapted from Inside School Improvement: Creating High-Performing Learning Communities *by Jackie A. Walsh and Beth D. Sattes, 2000, Charleston, WV: AEL, pp. 240-242.*

Grouping Students for Learning

An instructional group can be the total class and/or any subset of the total class formed for a specific purpose and a defined period of time. Groups may be formally or informally structured to increase engagement with academic learning and/or social learning.

Benefits accrue to students and teachers when groups are used: The teacher becomes the facilitator of learning, not the "sage on the stage." Students work with others of diverse abilities whom they may not know well, having an opportunity to learn their unique talents and find common interests. Mixed ability groups foster sharing of student knowledge and skills at high levels.

Leadership emerges as students work collaboratively toward a goal. Products improve as all students contribute rather than compete. Students experience authentic team work, developing skills they'll use throughout life. Discussion involves all rather than typical dyads of teacher question-student response. Also, student groups employ more creativity than often required in traditional teacher-directed instruction.

However, effectively using groups requires careful planning. The teacher must match the strategy to the content, choose appropriate methods and questions, expect collaboration rather than individual performance, form productive student groups, teach and reinforce norms for behavior in groups, monitor and provide assistance as needed, and create equitable assessment opportunities. Good teachers know the promises and perils of grouping students and how to use groups wisely to improve student learning.

While the subject is one about which many tomes have been written, major points concerning the formation and use of groups are captured in the mind map on the next page. Note that the "branches" provide further leads to explore. See what you think and check out the following sources, too.

Experiment!

- In "Thoughts on Student Grouping: Teaching Decisions," Peter Knowles offers a matrix of considerations related to grouping. It is available at www.netc.org/classrooms@work/classrooms/peter/working/grouping.html.

- Catherine Valentino's article on flexible grouping describes several organizational patterns to consider. It is available at www.eduplace.com/science/profdev/articles/valentino.html.
- Beatrice A. Ward synthesizes her research in "Instructional Grouping in the Classroom." Find it at www.nwrel.org/scpd/sirs/1/cu2.html.
- An article by Carol Damian of the Eisenhower National Clearinghouse, "Ability and Instructional Grouping Information," is available at www.adprima.com/grouping.htm.

On the Job: Collaborative Planning and Coaching

The school improvement specialist stories that appear in Improving Schools *come from real life. The names have been changed or removed to preserve confidentiality.*

Sharika Johnson was a new teacher, eager to do a good job. She came to me, her school improvement specialist, for advice on a student project for cooperative groups in her social studies classes. We looked at the objectives and standards she wanted to meet, and we brainstormed a number of projects before choosing one. I worked with her to be sure she had a genuine group goal and a way to determine individual accountability. In addition, I wanted her cooperative groups to have a reward for work well done.

Although the new teacher was ready to present the assignment the next day, I encouraged her to wait until she determined the makeup of the groups. We looked at the ability levels and social skills of the students in her class to create specific cooperative groups. Ms. Johnson was amazed at this level of consideration, as her previous attempts at cooperative grouping were to tell students to choose a group and work together.

We discussed her role in teaching the students how to work in a group. Ms. Johnson quickly realized she had to teach cooperation before she could assign the project. She now had several challenges for the following days: she had to organize students into cooperative groups and teach them the roles of cooperation. Only then could she present the project requirements and the rubric for grading.

I worked with Ms. Johnson after school to create a lesson plan. Although I attempted to coach her through it, she frequently asked my advice and requested suggestions. I asked if she wanted me to teach the first of her three social studies classes the next day. I could demonstrate the lesson plan and she could learn from that demonstration and teach the rest of the classes herself. Her planning period came between the second and third social studies classes, so we would have an opportunity to confer during the day. Ms. Johnson gently turned me down. She had worked hard with me to plan this lesson, and she wanted to teach it herself. How about if I came, watched, and gave her feedback? I agreed, a little reluctantly, as I was not sure she was ready to teach the lesson.

The next day I sat in the back of the room and watched Sharika Johnson execute our lesson plan. She stumbled a bit over the rationale for assigning group members, but she was clear in her modeling of cooperative roles and procedures. The class made T-charts of appropriate behavior and practiced procedures. The lesson was not perfect, but it succeeded. When the class was over, we had six minutes between classes for a quick assessment.

"What did you think?" we asked each other simultaneously. "You first," I said. "They got in their groups sooner than I thought," she said. "I wish I had put group names on the overhead. I can do that for the last class. Do you think I spent enough time practicing the different roles?" Immediately, Ms. Johnson was critiquing her own practice. I gave her positive feedback and told her we'd talk during her planning period.

I observed only a few minutes of the second class before I had another appointment. When we met during the planning period, Ms. Johnson was ready with comments and questions. She had already modified the lesson and had ideas for improving it even more for the last class. In addition, she had developed some ideas to toss about for the following day's lesson. I helped her reflect on the first two classes and coached her through the next day's lesson plan.

This teacher was so very proud that she had successfully taught a difficult lesson on a concept that was new to her. Would she have been as proud if I had done a demonstration class for her to watch? I will never know, but I learned the power of collaborative planning and simultaneous coaching.

The temptation was strong for me to tell Sharika Johnson how to structure the lesson. After all, I was supposed to be the expert. I stopped myself and began asking questions designed to build success on the part of the teacher. For example, I asked her how she might engage students at the beginning of the class to build motivation for working in collaborative groups. She thought of the sports team analogy and the local television news team, with each person having a different role. Together we brainstormed how to use these analogies to build cooperative teams.

Throughout the coaching process, I relied on the expertise of the teacher. She had the opportunity to lean on me for a demonstration lesson, but she felt comfortable enough with the initial coaching to try it alone.

While demonstration teaching has many advantages, now I often use the collaborative planning/coaching model instead. It takes a bit more time with the teacher up front, but the time accomplishes three tasks. First, it models collaborative professional planning. Sometimes with a demonstration lesson, the school improvement specialist is the only planner and the teacher merely an observer. Second, the collaborative planning/coaching model taps the expertise of the teacher and builds self-confidence. Finally, it offers the coach an opportunity to observe the teacher immediately and provide additional coaching on the concept.

With Sharika Johnson, the process built a stronger collegial relationship and a feeling of personal confidence. When I visited the class two weeks later to see the projects, I'm not sure who was proudest: the students, Ms. Johnson, or me.

Reflection

- What were the important steps in this process of collaborative planning and coaching? What might have happened had the school improvement specialist omitted one of these steps?
- What important lessons about coaching can you draw from this?
- This school improvement specialist states that she now frequently uses collaborative planning and coaching in lieu of demonstration teaching. Think about the relative advantages and potential downsides of each method. Under what circumstances would you likely choose demonstration teaching? collaborative planning and coaching?

> Teaching often lacks a sense of ownership, a sense among the teachers working together that the school is theirs, and that its future and their reputation are indistinguishable. Hired hands own nothing, are told what to do, and have little stake in their enterprises. Teachers are often treated like hired hands.
>
> —Ted Sizer, *Horace's Compromise: The Dilemma of the American High School*

Reference

Sizer, T. R. (1984). *Horace's compromise: The dilemma of the American high school.* Boston: Houghton Mifflin Company.

Using Culturally Responsive Teaching

[School reform literature] *suggests that when schools succeed with culturally diverse and socioeconomically disadvantaged students, there exists a powerful belief system of high expectations that rejects deficit assumptions about children and their cultures, abilities, and life circumstances.* Belinda Williams, *Closing the Achievement Gap,* p. 190

The No Child Left Behind legislation proposes to increase achievement and to eliminate achievement gaps for all students. Because the achievement gap is a complex phenomenon, educators need a culturally responsive approach to education, one that acknowledges the strengths that minority and socioeconomically disadvantaged learners bring to the classroom: that is, they are culturally different from their White middle-class peers; they have unrecognized abilities and underdeveloped potential; and they are engaged, self-motivated, and resilient (Williams & Newcombe, 1994). When culturally responsive instruction occurs, teachers draw on students' home cultures and experiences

as resources for teaching and learning instead of viewing them as barriers to education (Gay, 2000).

Culturally responsive instruction is supported by a growing body of research (see, for example, Irvine & Armento, 2001; numerous studies conducted by the Center for Research on Education, Diversity and Excellence; and Darling, 2005). These studies find that culturally responsive teaching includes (a) the use of curriculum that is both rigorous and relevant to students' lives and (b) the teacher's desire and ability to build trusting relationships with students and families that extend beyond the classroom.

What Is Culturally Responsive Teaching?

According to Ladson-Billings (1994), who defined the theory and practice of culturally responsive pedagogy through her study of exemplary teachers of African American students, culturally responsive instruction is "an approach that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes" (p. 18). Such an approach suggests that to facilitate learning, teachers need to value, become familiar with, and leverage the cultural experiences of their students. Also, teachers should build on students' funds of knowledge by "using the knowledge and skills students bring to the classroom as a foundation for new learning" (p. 124).

In culturally responsive classrooms, teachers practice three R's of instruction. First, they ensure that curriculum is *rigorous* by teaching to the highest standards, and they hold high academic and personal expectations for each student.

Second, the curriculum must be *relevant* to students' lives in ways that motivate them to learn. For example, curriculum materials can reflect the cultural diversity within the classroom. Students can have some voice and choice in the ways in which they acquire and demonstrate knowledge and skills.

Finally, a culturally responsive teacher develops caring, trusting *relationships* with all students and their families (Gay, 2000). When students know that teachers care about them personally and are concerned about their academic progress, they are more willing to learn. However, culturally appropriate caring may look different for different groups of students. European American and Asian American students may enjoy having their success acknowledged publicly, but students from other cultures may be uncomfortable with recognition that separates them from their peers.

Is Culturally Responsive Teaching Different From "Good Teaching?"

Culturally responsive teaching includes all that is considered good teaching but also acknowledges the student's cultural background, builds on the student's experiences, and affirms his or her cultural identity (Ladson-Billings, 1994; Williams & Woods, 1997; Zeichner, 2003). Although good teaching includes factors such as having strong content knowledge and aligning the taught and tested curricula, these factors may be present in a

classroom where the teacher does not value and affirm the students' cultural identity or build on the knowledge and skills students bring to the classroom. When teachers do not value or meet the cultural needs of their students, it is difficult for them to develop cross-cultural relationships with the students. The disproportionate numbers of culturally diverse students referred to special education has in part been attributed to a disjuncture between a teacher's standard pedagogy and the learning needs of students who are part of the changing demographics in our nation's schools (Losen & Orfield as cited in Villa and Thousand, 2005).

Edvantia's Principles of Culturally Responsive Teaching

High expectations. School staff consistently communicate that they believe in students' ability to succeed. When teachers hold high personal and academic expectations for students, they collectively and individually assume responsibility for student learning. Holding high expectations for all students involves teaching complex thinking through challenging activities and applying clear standards and systematic feedback on performance (Doherty et al., 2003).

Cultural competence. Educators value students' cultures, beliefs, and families, and incorporate those in school and classroom practices. Educators exhibit cultural competence by contextualizing instruction in the experiences and skills of students' homes and communities (Doherty et al. 2003). Perhaps most important, they help students learn to be bicultural: that is, they help students learn to honor and embrace the best of their community's culture, language, and values, while understanding and successfully navigating the cultures of others and learning the English language (Ladson-Billings, 1994; Gay, 2002; Doherty et al., 2003).

Active teaching. Teachers facilitate learning by engaging students in a variety of activities, including instructional conversations. "Key to this approach is the recognition that learning takes place through a dialectical process of active participation, and not just within an individual's mind" (Bennett et al., 2004, p. 12). An active classroom is characterized by a variety of instructional strategies that require collaboration and social discourse between teacher and students, including reading, writing, and speaking activities; hands-on/interactive activities; cooperative learning; student-generated projects; and problem-based learning.

Student-controlled discourse. Teachers create classrooms that invite dialogue, which forms a basis for instruction. Teachers treat students as intellectual leaders, encouraging the formation of a community of learners where teacher and students learn together. They engage in instructional conversations with small groups of students, and they view students' experiences and communication styles as funds of knowledge that can be used in the teaching and learning process (Ladson-Billings, 1994; Gay, 2002; Doherty et al., 2003). They use classroom assessments that encourage students to communicate with authentic audiences.

Relevant curriculum and instructional practices. When teachers develop challenging curriculum and instructional practices that are relevant to students' lives, the content reflects diverse cultural, ethnic, and gender perspectives. Classroom management practices facilitate student interaction and engagement with instruction. Instruction begins with assessment or activation of students' prior knowledge and provides scaffolding or enrichment appropriate to individual students (Bennett et. al, 2004).

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A Review of the Research Literature on Effective Instructional Strategies

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Introduction

The recent legislative focus on high-stakes testing and accountability has greatly increased the pressure on educators to improve student achievement. Thus, effective teaching has come to be somewhat narrowly defined as *teaching that raises the academic achievement of all students*. According to Marzano (2000), teacher-level variables that have been associated with student achievement abound. These variables are commonly grouped into three categories: instruction, classroom management, and curriculum design. Although each of these categories contributes to the overall quality of the educational experience within a classroom, this review is limited to the category of instruction.

Ideally, rigorous experimental research would have determined which instructional strategies have proven effective at improving student achievement. Unfortunately, the availability of such research is limited because of the difficulties involved in manipulating classroom environments to achieve experimental situations, such as randomly assigning students and teachers to treatment and control groups. Rigorous experimental studies, while rare, do exist and do shed light on the effectiveness of various instructional strategies. The purpose of this review is to examine the experimental, quasi-experimental, and correlational research on instructional strategies used by effective teachers and propose a conceptual framework in which these strategies can be made more accessible to all classroom teachers.

Marzano conducted a theory-based meta-analysis of meta-analyses of studies on instruction, which he defines as "those direct and indirect activities orchestrated by the teacher to expose students to new knowledge, to reinforce knowledge, or to apply knowledge" (Marzano, 1998, p. 62). Based on his meta-analysis, Marzano identified nine categories of instructional variables; he reports these along with their effect sizes (ESd), which ranged from .59 to 1.61. Hattie (1992) and Wenglinsky (2002) also conducted studies on classroom practices that are related to student achievement. While these two scholars propose their own conceptual paradigms, with distinct differences from Marzano, the components of the suggested teaching strategies are very similar.

The findings of these three researchers revealed that the instructional strategies with medium to large effect sizes, indicating a positive relationship with student learning, could be grouped into two *macrostrategies* (metacognition and active student engagement) and three *microstrategies* (higher order thinking, cooperative learning, and independent practice). Existing research supports the position that these five strategies are associated with increased student achievement and thus form the centerpiece of effective instructional frameworks.

Macrostrategies

Macrostrategies are akin to guiding principles of central importance that can be suffused throughout various instructional activities. Two macrostrategies that have been associated with increased student achievement (metacognition and active student engagement) are described below.

Metacognition

Metacognition is broadly defined as *thinking about thinking*. Perkins (1995) applies a more precise definition: the monitoring and management of one's thinking. This definition adds the concept of active assessment of one's own thinking process. Other definitions of metacognition build on this expanded concept and include more specific components of the skills involved with metacognitive thinking. Metacognition can be defined as gaining knowledge and control of factors that affect learning such as knowledge of self, the task at hand, and strategies to be employed (Baker & Brown, 1984; Palincsar & Brown, 1981), or the ability to predict one's performance on various tasks and monitor current levels of mastery and understanding (Bransford, Brown, & Cocking, 2000; Brown, 1975; Flavell, 1979). The effort to define metacognition in these terms belies its central importance to the educational process. Those who have studied metacognition conclude that being aware of oneself, and the thinking processes one goes through while completing the tasks at hand, leads to better understanding of concepts and the ability to attain and transfer new knowledge.

A large body of research supports the incorporation of metacognitive skills in educational settings and its positive association with student achievement. For several decades this concept has been a favorite among professionals in the fields of education and cognitive psychology. Academic improvement and the ability to transfer knowledge to new situations using metacognitive strategies have been found across disciplines at all grade levels with a wide range of students (Bransford et al., 2000; White & Frederiksen, 1998; Scardamalia, Bereiter, & Steinbach, 1984; Schoenfeld, 1983, 1984, 1991). Studies that suggest no significant relationship are those that have been conducted with either small sample sizes or in contexts that may not be generalizable to a wider population of students (Higgins, 2000; Kuyper, van der Werf, & Lubbers, 2000). Therefore, the general consensus among education professionals is that teaching metacognitive skills is associated with improved student achievement.

Despite this level of support, teaching strategies that incorporate metacognition are not common practice in many classrooms across the country. The reason for this is twofold. First, metacognition is not an instinctive process; therefore, deliberate efforts must be made by teachers and students to call attention to it when it is occurring. Doing so can be difficult because the process often occurs as an *internal dialogue*, meaning there are no tangible or verbal cues to aid in awareness (Bransford et al., 2000; Wolf & Brush, 2000). Second, the most successful strategies for teaching metacognition require the complete reorganization of a student's thinking process, which involves much more than simply pointing out when metacognition is occurring (Perkins & Grotzer, 1997). This level of teacher engagement can be intimidating for educators who struggle with their own metacognitive processes and are overwhelmed with the pressures of meeting high-stakes accountability goals. Nevertheless, the apparent benefits of incorporating metacognitive strategies would seem to justify the time and effort required to teach them to educators and students.

Marzano (1998) drew the conclusion, based on his meta-analysis of meta-analyses of experimental research on instruction, that metacognitive thinking was the primary vehicle for

student learning. The results of his study suggested an average effect size[1] of .72 for strategies that incorporate metacognition. This finding strongly suggests that metacognition become a centerpiece of any instructional setting. Marzano identifies three processes necessary for teaching metacognitive skills: *goal specification* (an effect size of .97), *process specification and monitoring* (an effect size of .74), and *disposition monitoring* (an effect size of .53). Understanding these processes is the key to developing instructional strategies that will help students become aware of how they think.

According to Marzano, *goal specification* is the practice of providing students with specific learning objectives prior to the lesson. Arming students with learning objectives before the lesson begins allows them to create a road map so they can accurately monitor their own progress toward the desired educational outcomes. *Process specification and monitoring* involves teacher-student interaction whereby feedback is provided on the strategies students use to complete specific tasks or achieve established goals. This allows students to recognize weaknesses in their selection and implementation of specific strategies and to make immediate adjustments to better strategies so that they do not waste time being ineffective. *Disposition monitoring* requires that teachers allow for an appropriate amount of wait time for students to consider a thinking plan for a given task and to engage students by overtly reminding them to activate specific thinking behaviors. This allows teachers to reinforce thinking strategies that are not instinctive for students. Underscoring the importance of applying these processes and the significant relationship that metacognition can have on improving student achievement is the fact that eight of the nine instructional strategies included in *What Works in Schools: Translating Research into Action* (Marzano, 2003) involve some degree of metacognition.

The authority of Marzano's research is derived from the extensive nature of the work included in his meta-analysis of research on instruction. By reviewing 395 experimental studies, he lends credibility to the estimated effect sizes that he presents. However, the quality of research in those studies varies widely, and many are several decades old. For the purposes of this review, studies published after Marzano's reviews were evaluated. While there are many publications on metacognition and its effect on student achievement, criteria can be applied to narrow the field to those articles that have the strongest methodological designs and the most reliable results. The criteria applied in selecting research for this review were that the study design was experimental, quasi-experimental, or a rigorous correlational design and that it reported sufficient evidence of reliability as well as internal and external validity. The selected studies, discussed below, were experimental and were published in peer-reviewed journals.

Cardelle-Elawar (1995) focused on the effects of metacognitive strategies on 489 low-achieving mathematics students in Grades 3 through 8 in a primarily Hispanic setting. The strength of the study design is that students in each of the grade-level classes were randomly assigned to 12 treatment groups and 6 control groups. The experimental groups received mathematics instruction based on the Mayer model, which teaches students how to apply metacognitive strategies to problem solving. The Mayer model involves teaching problem solving through self-questioning and monitoring of the processes required for solving

[1] Marzano uses the Glass (1976, 1978) formula for defining and computing effect size (experimental mean/control mean/standard deviation of the control).

mathematical problems (Mayer, 1985, 1987). The control groups received mathematics instruction in a more traditional format. Teachers for each experimental group received training on implementing the Mayer model and were given support throughout the treatment. Unannounced observations by the researchers, as well as follow-up interviews, were conducted to ensure internal reliability and validity. Both groups were pretested and posttested in mathematics. The results showed a statistically significant improvement in the mathematical achievement of students receiving metacognitive strategies for problem solving.

A similar study conducted in South Africa examined the effects of metacognitive strategies on the mathematics achievement and attitude of seventh-grade students. In this study, 40 low-achieving students from one school were randomly assigned to an experimental or a control group. Both groups were given pretests to determine levels of metacognitive awareness and attitudes toward mathematics. Students in the experimental group learned metacognitive approaches to solving mathematics problems, while those in the control group were taught using traditional methods. For example, on individual written assignments, students in the control group had their work assessed by the teacher and returned without further comments. By contrast, students in the experimental group had their assignments assessed and errors identified. These students were then interviewed by the researcher to determine their thought processes while solving the problem and were then given specific strategies to help correct their mistakes. Posttest scores revealed that the mathematics achievement of the experimental group was significantly higher than that of the control group. Experimental group students also scored higher on tests of general ability, metacognitive awareness, and attitude toward mathematics (Maqsud, 1998).

An Israeli study also considered the effects of metacognition on mathematics instruction; however, this study differed in that both the control and the experimental groups were taught in a cooperative setting. The study was conducted over a two year period in which 122 eighth-grade students were randomly assigned to mathematics classes by the school administration. The researchers then randomly assigned these intact classes to either the treatment or control groups. The experimental group was taught to work in cooperative learning groups to solve new types of mathematical problems by applying metacognitive strategies that included comprehension, connection, strategic, and reflection questions. The control group learned through the traditional instructional method of examining a correctly worked-out example and then working as a cooperative group to solve similar practice problems. Students in both groups were tested immediately after the conclusion of instruction and again one year later. In addition to taking the posttest, eight teams (three from the control group and five from the treatment group) were randomly selected to participate in a problem-solving session in which their behaviors were videotaped. These observations were transcribed and coded to identify common behaviors of both groups. The findings of this study suggest that exposure to metacognitive strategies resulted in students who statistically outperformed those in the control group both immediately and in the delayed posttest and that, when working to solve more complex problems, students in the treatment groups engaged in a higher level of cognitive and metacognitive discourse (Mevarech & Kramarski, 2003).

Unlike the previous studies that examined the effect of metacognitive strategies in various settings versus a traditional approach, the final two studies selected for this review examined the effects of multiple strategies. Glaubman, Glaubman, and Ofir (1997) examined

the effects of two methods, active processing and metacognitive strategies, on the questioning skills of kindergarten students. Ninety-three students were randomly assigned to an active processing group, metacognition group, or control group, and each group completed a pretest. Intervention strategies in the two experimental groups occurred for 30 minutes a week over a 15-week period. After the treatments, students were posttested using the same instrument as the pretest. Also, a sample of the participants was posttested again after three months. Students in the active processing and metacognition groups performed significantly better than those in the control group. In addition, results showed that students who received metacognitive training performed better than those receiving active processing, especially in the ability to generate quality questions and to self-direct learning. These significant effects were still evident in the delayed posttesting (Glaubman et al., 1997).

Oladunni (1998) investigated the effects of applying metacognition and heuristics to problem-solving in mathematics. In this study, 245 students were randomly selected from six secondary schools in Nigeria and placed into two experimental groups (metacognitive problem solving strategies and heuristics problem solving) and one control group. All students were pretested to ensure homogeneity of groups, and all participated in an eight week intervention, after which they were given a posttest. The results indicated that students in both experimental groups performed significantly better on the posttest, leading Oladunni to conclude that "metacognitive problem solving techniques are effective and could enhance computational achievement in mathematics" (p. 873).

Taken together, these five experimental studies provide ample evidence for the power of metacognition to improve student achievement. Further, there is no shortage of research reporting similar results for a wide array of content areas (for example, see Haller, Child, & Walberg, 1988; McInerney, McInerney, & Marsh, 1997; Chiang, 1998; Bangert-Drownes, Hurley, & Wilkinson, 2004). Research into the impact of metacognition strongly suggests that the effects are persistent regardless of student age, achievement level, nationality, or ethnicity. These skills are transferable to other learning situations and are retained over a long period of time.

Active Student Engagement

Over the past 20 years, definitions for intelligence and theories about how knowledge is acquired have changed dramatically (Cognition and Technology Group at Vanderbilt [CTGV], 1996). In the past, the process of learning has been viewed as a largely passive experience in which knowledge is received from others and stored for future use. Research into the operation of the human brain has shed light on the functional process of learning, however, and led to paradigms that reflect a more active model of knowledge acquisition. In this model, knowledge is constructed through interacting with the physical world, acknowledging and appreciating the social context of learning environments, and reorganizing existing mental structures (CTGV, 1996).

Theoretically, active student engagement strategies are used to encourage students to interact with new content instead of passively observing. Active interaction with the curriculum encourages students to become engaged, thus allowing for a better understanding of the material and eliciting links to previous knowledge and experience (Dewey, 1916). Typically,

classrooms that use active engagement have hands-on lessons that require students to use multiple learning skills and higher order thinking to construct meaning and knowledge (Resnick, 1987; Bruner, 1960). The teacher in this type of setting acts as a facilitator for the development and construction of knowledge (Doolittle & Camp, 1999; Becker & Maunsaiyat, 2004). By contrast, traditional methods such as lecture and memorization are passive models whereby students receive information and relay it back to the teacher during formal assessment. Despite recent shifts in theoretical paradigms, many classrooms still feature passive instructional strategies. Therefore, to improve student achievement on a large scale, it is necessary to replace models of passive instruction with those of active student engagement.

Active student engagement strategies are rooted in cognitive learning theories such as constructivism and experiential learning. Constructivism holds that knowledge is not "out there" to be acquired; rather, it must be constructed through the merging of each individual's own personal experiences with new concepts and skills (Dewey, 1916; Bruner, 1960; Piaget, 1970). Experiential learning is that which is useful and relevant to life outside of school (Rogers & Freiberg, 1994). It reflects the needs and interests of the learner because there is direct personal involvement on behalf of the student, and learning is primarily initiated and evaluated by the learner. Because the knowledge gained is relevant to the student's daily life, the learning that occurs is long lasting and has significant impact on the student (Open Learning Technology Corporation Limited, 1996).

Seven of the nine instructional strategies identified as effective by Marzano (2003) promote active student engagement:

- identifying similarities and differences (effect size 1.61)
- summarizing and note taking (effect size 1.00)
- homework and practice (.77 effect size)
- nonlinguistic representations (effect size .75)
- cooperative learning (effect size .73)
- generating and testing hypotheses (effect size .61)
- questions, cues, and advance organizers (effect size .59)

Similarly, all eight of the strategies identified by John Hattie (1992) as related to student learning are also designed to actively engage students. There is some discrepancy in the effect sizes reported by these two studies; however, this is primarily due to the scale and contextual variables of each study and not to significant variations in the impact found between the strategy and student learning (Marzano, 2003).

Another prominent voice in instructional strategies associated with student achievement is Wenglinsky. Using the results of the 1996 (National Assessment for Educational Progress) assessment, Wenglinsky (2000, 2002) studied the link between student academic performance and instructional strategies using active student engagement—specifically, hands-on-learning—as a key component. Wenglinsky (2000) found that "students whose teachers conducted hands-on learning activities outperformed their peers by more than 70% of a grade level in math and 40% of a grade level in science" (p. 7).

Although it has become widely accepted in the field of education that active student engagement is associated with higher achievement and greater academic performance for students, few methodologically rigorous studies examine the direct link between active student engagement and achievement. There are several likely reasons for this gap in the literature. First, researchers and education leaders have a difficult time defining active engagement. It is most easily defined by what it is not: passive learning. Also, it is easier to design rigorous research experiments that focus on discrete examples of active engagement. As a result, most studies choose to investigate the link between specific strategies (e.g., cooperative learning, discovery learning, and guided inquiry) that incorporate active student engagement instead of the overall impact of student engagement.

Taylor, Pearson, Peterson, and Rodriguez (2003) illustrate how active student engagement is related to improving student achievement in reading. In this study, nine students were randomly selected from each of 88 different classrooms (Grades 1-5) in nine high-poverty schools, constituting a stratified random sample of classrooms. A pretest was administered to all 792 participants to establish a baseline of literacy measures for their appropriate grade level. The classrooms were periodically observed over the course of one school year, and each was categorized as an active or passive learning environment, based on criteria established by the researchers. A posttest was then administered. Hierarchical linear modeling found a significant, positive correlation between active learning environments and growth in reading comprehension, whereas the correlation was negative in passive learning environments. The results of the statistical analysis led the authors to conclude that active student engagement was of paramount importance to improving student achievement in reading.

Greene and Miller (1996) found positive links between meaningful engagement and the achievement of college students. This study included 108 educational psychology students. Data were gathered from the administration of a midterm examination and a motivation and strategy-use survey. The results of this study were consistent with existing literature in that perceived ability and student learning goals were significantly and positively correlated to meaningful cognitive engagement. Also, the researchers found that perceived ability and student learning goals had a significant, positive relationship with student achievement. They concluded that "attempts to teach strategies that promote meaningful cognitive engagement will have a stronger impact when students have confidence in their ability to learn and a learning goal orientation" (p. 190).

Few quantitative studies focused specifically on active student engagement because it is difficult to isolate the impact of active engagement from other variables affecting the classroom. This is why most studies, instead, evaluate specific microstrategies that incorporate active engagement. However, it is possible to garner an increased understanding of active student engagement through rigorous qualitative research. Qualitative research further provides important insights into how an active classroom setting energizes students and promotes investment in their learning.

One such study (Weiss & Pasley, 2004) examined, among other variables, the impact of active engagement in science and mathematics classes. Systematic stratified sampling was used to select 40 middle schools from those participating in the 2000 National Survey of Science and Mathematics Education. One feeder elementary and a high school for each middle school were

randomly selected to participate as well. Two mathematics and two science teachers from each participating school were randomly selected for classroom observations. Observation protocols were developed to focus on the quality of the mathematics and science content, the quality of implementation, and the extent to which students were engaged based on a 5-point scale (1 = *poor*, 5 = *excellent*) and an overall score for the lesson assigned. From these ratings, coupled with data gathered through teacher interviews, the researchers analyzed the components of very ineffective lessons and very effective lessons. They concluded that effective mathematics and science instruction invited "students to interact purposefully with the content" and included "various strategies to involve students and build on their previous knowledge" (p. 25).

Microstrategies

Microstrategies are instructional strategies that operationalize guiding principles or macrostrategies. Three microstrategies have been associated with increased student achievement: higher order thinking, cooperative learning, and independent practice/homework.

Higher Order Thinking

Higher order thinking is addressed under many different names, such as critical thinking, strategic thinking, or thinking skills. Definitions of the skill are as diverse, and the identification of a single, all-encompassing definition is difficult at best. Higher order thinking can be described as the ability to consider information in such a manner as to solve problems, analyze arguments, negotiate issues, or make predications (Underbakke, Borg, & Peterson, 1993; Wenglinksy, 2002). It also involves examining one's assumptions and values, evaluating evidence, and assessing conclusions as part of a methodical set of skills that must be taught (Petress, 2004). Normal thinking occurs in default patterns that are often hazy, narrow, fuzzy, and sprawling (Perkins, 1995). Improving their ability to think requires that students be instructed on specific methods that combat these default patterns. When students use these higher order thinking skills to reorganize their thinking, they can engage more meaningfully with concepts and transfer them to new instructional material.

When Marzano (2003) identified nine categories of instructional strategies related to student learning, he found four that deal specifically with higher order thinking skills:

- identifying similarities and differences (1.61 effect size)
- nonlinguistic representations (.75 effect size)
- generating and testing hypotheses (.61 effect size)
- questions, cues, and advanced organizers (.59 effect size)

Similarly, other researchers have concluded that for students to be able to apply new skills and concepts, they must be able to effectively combine new information with existing knowledge (Underbakke et al., 1993). Application of higher order thinking skills facilitates this ability and yields higher student achievement (Bigge & Shermis, 1992; Mayer, 1992; Meyers, 1987; Schoenfeld, 1987). In his review of existing qualitative research, Wenglinsky (2002) also found support for the positive relationship between higher order thinking skills and student

achievement in mathematics. After examining the data from the 1996 NAEP mathematics assessment, Wenglinsky (2002) concluded that higher order thinking skills were positively associated with achievement.

An example of the impact of higher order thinking on student achievement is found in an experimental study conducted by Adey and Shayer (1993). The study examined the effect of a science curriculum on the long-term and transfer effects of cognitive development and student achievement. The science curriculum was designed to teach metacognition, skills for resolving cognitive conflict, and bridging of concepts. Twenty-four classes of students were selected from eight public schools in England and then randomly assigned to a treatment or control group. There were both treatment and control groups in each school. The treatment groups received the cognitive-based science curriculum, while the control group continued to receive the traditional curriculum. In posttests immediately following the intervention, students in the treatment group showed significant improvements in cognitive development as well as higher achievement, not only in science but also in mathematics and English language. Students in both the control and treatment groups were retested one and two years after the intervention. In all measures, the treatment group continued to score higher. This study suggests not only that higher order thinking skills can lead to immediate and long-term improvements in achievement but that such skills are transferable to other disciplines as well.

Similar results were found by Haywood (2004), who conducted a quasi-experimental study on the effects of a cognitive education program, Bright Start, on poor immigrant children in the south of France. This program was designed to teach higher order thinking through logical reasoning and problem-solving skills. Students in the treatment group received the Bright Start curriculum in preschool, while those in the control group received only the standard preschool curriculum. The treatment group outperformed the control group in general knowledge and in making verbal comparisons, distinguishing relevant differences, and reading new words. In addition, children who received the Bright Start curriculum significantly closed the achievement gap between themselves and native French primary school children. These results corroborate Adey and Shayer's 1993 findings of long-term retention of skills as well as transferability.

Other studies have shown links between higher order thinking and student achievement through the use of teachers' questioning behaviors during instruction. For example, Redfield and Rousseau (1981) conducted a meta-analysis of 14 experimental or quasi-experimental studies examining the effects of teacher questioning on student achievement. They concluded that the use of questioning that requires students to use higher order thinking leads to significant gains in student achievement (effect size: 0.7292). The use of such questions helps students make direct links between old and new knowledge as well as between concepts of different disciplines, such as mathematics and science (Weiss & Pasley, 2004). Other research has shown that this effect is enhanced when teachers include appropriate wait time for responses and provide appropriate cues and feedback. For example, Lysakowski and Walberg (1982) synthesized 54 studies, including published and unpublished experimental and observational research, to determine the overall impact of wait time, cues, and feedback. The individual results of the selected studies were calibrated so that effect sizes would fall on a common scale. Analysis of these weighted effect sizes resulted in an overall effect size of 0.97,

indicating "large and consistent effects of instructional cues, participating, and corrective feedback in learning in naturalistic settings" (p. 570).

Taken together, these studies indicate that instructional strategies emphasizing higher order thinking are positively related to student achievement. The strategies may vary significantly in form, from identifying similarities and differences to using advanced organizers that allow students to create a roadmap for learning. However, all of them involve actively engaging students in the learning process while promoting the use of organized thinking strategies that can lead to metacognition. Instructional strategies that use higher order thinking as a means to achieve active student engagement and metacognitive thinking show the strongest relationship to improved student achievement.

Cooperative Learning

For several decades now, cooperative learning has been an increasingly popular trend in education, with significant support for its ability to promote active engagement of students and raise achievement. In cooperative learning environments, students are grouped, either heterogeneously or homogeneously, to complete tasks ranging in scale and difficulty from brief summary exercises to in-depth research projects. Many of the principles upon which cooperative learning is built are based on cognitive learning theories and brain-based research. Vygotsky's (1978) theory of social development states that development of cognition is heavily dependent upon social interaction and is limited to a certain range at any given time. He uses the concept of a "zone of proximal development" to symbolize the distance between the actual developmental level of a child working independently and the potential development of level of that child working under the guidance of an adult or with peers. This *zone* represents an opportunity for cognitive change (Vygotsky, 1978; Hausfather, 1996). Vygotsky also states that the classroom is a complex social environment where learning is a result of interaction with adults and peers.

Outside of school, informal learning occurs during shared activities within social systems such as work and family groups (Resnick, 1988). Inside of schools, however, learning is predominantly an independent exercise. According to Resnick, students are individually responsible for their own assignments, progress, and grades. This presents a problem in that the current education system is failing to prepare students to enter the workforce, where interdependence is vital for success. Cooperative learning groups foster social interaction and development by increasing students' social attitudes and behaviors (Miller, 1995). Students are able to focus on learning style preferences and areas of personal strengths while developing critical social skills that are essential for success in the world outside of school (Tyrell, 1990).

Marzano (2003) names cooperative learning as one of nine instructional categories. It shows a medium effect size (.73), which translates to an achievement gain of 27 percentile points. John Hattie (1992) does not deal specifically with cooperative learning in his research on effective strategies; however, Wenglinsky (2002) does state that the current qualitative research strongly supports collaborative learning as an effective instructional practice.

Studies also show benefits for using cooperative learning as a means to actively engage students and raise achievement. Nichols (1996) examined the impact of cooperative learning

groups on student achievement and motivation in a high school geometry class. Eighty students were randomly assigned to one of two treatment groups that received instruction through a specific cooperative learning method (Student Teams Achievement Divisions) or to a control group that received instruction through traditional methods. Students in the treatment group were heterogeneously grouped, based on achievement scores from previous mathematics classes, and were given both individual and group grades for assignments. Students in the control group received traditional lectures and completed assignments independently. At the conclusion of the treatment period, students completed an 83-item survey to determine motivation and a teacher-made comprehensive exam to measure achievement. The results of this study indicated that students in both treatment groups showed significantly greater gains in achievement and reported increases in value of the material learned, self-efficacy, and use of deep processing skills.

Whicker, Bol, and Nunnery (1997) also found greater improvement for mathematics achievement through cooperative learning. In this study, two classrooms of rural high school precalculus students were randomly assigned to a treatment or control group. All 31 students completed a pretest. The treatment group was heterogeneously grouped based on previous semester grades according to the Student Teams Achievement Divisions (STAD) model. The control group received traditional mathematics instruction and completed assignments individually. A posttest was administered to both groups, and students in the treatment group were asked to answer a questionnaire. Students in the treatment group scored significantly higher on the achievement test than students in the control group. The results support previous research that shows cooperative learning to be an effective means of raising mathematics achievement and extends this support to include higher-level mathematics, such as precalculus. In addition, students in the treatment group reported high levels of satisfaction with working in cooperative learning groups.

Leonard (2001) conducted a study investigating the impact of heterogeneous and homogeneous grouping on student achievement in small-group settings. Ninety-five sixth-grade students were assigned to one of three classes. The Maryland Functional Mathematics Test, Level I (MFMT-I) was used as a pretest for all students. These data were used to create an experimental group (students grouped homogeneously by race, gender, and ability) and a control group (students grouped heterogeneously by race, gender, and ability). Students in both groups received the same instruction. The MFMT-I was used as a posttest once the intervention was completed. In addition, 12 students from either the control or treatment groups were randomly selected, and their group interactions were videotaped for qualitative analysis on group interactions and thought processes. The quantitative results showed that low- and middle-achieving students from the control group (heterogeneous grouping) scored significantly higher on the posttest than did students from the experimental group (homogeneous grouping), although there was no significant difference in the posttest scores of high-achieving students in either group. The researcher concluded that heterogeneous grouping, rather than homogeneous grouping, leads to improvements in student achievement. Furthermore, the qualitative research into student interactions within group settings revealed that students of all ability groups can meaningfully contribute to the learning process.

One frequently heard criticism of cooperative learning has been that it is difficult to accurately assess the performance of individuals within the group setting. Classroom teachers

are concerned that one or two students may assume the bulk of the responsibility for completing tasks while others in the group do not contribute equally. They question whether a group grade is really reflective of the contribution of individual students. This is a topic that has not been thoroughly investigated; however, Scarloss (2002) examined this concern in the context of a larger study. Thirty-nine heterogeneous cooperative learning groups completed five cooperative learning assignments, each of which was scored based on preestablished rubrics designed to assess both group and individual performance (a total of 30 rubrics were used for the five activities). In addition to the scoring rubrics, each student completed individual essay and multiple-choice tests. With respect to academic performance within cooperative learning groups, Scarloss found correlational evidence to suggest that group performance scores are an accurate measure of individual performance and contribution. While further research is necessary on this topic, the Scarloss study suggests that effectively assessing individual and group performance in cooperative learning instruction is possible.

The studies examined show a positive relationship between cooperative learning and student achievement, as well as other factors such as motivation and improved social interactions with adults and peers. The positive relationship between cooperative learning and student achievement has been demonstrated for students ranging from elementary through graduate school (for examples, see Vaughan, 2002; Stockdale & Williams, 2004; Peterson & Miller, 2004; Janes, Koutsopanagos, Mason, & Villarand, 2000; Nichols, 1996; Jacobs, Watson, & Sutton, 1996). In addition, it appears that eliminating intergroup competition from cooperative learning tasks enhances its impact (Yu, 2000). While the nature of tasks assigned to cooperative learning groups may vary significantly from one teacher or discipline to the next, it is clear that this strategy, applied appropriately, can be used as an effective means to actively engage students in the learning process. In addition, many of the skills required to monitor group progress and work collaboratively require the use of higher order thinking and provide opportunities to employ metacognitive skills. It is important, however, to recognize that teachers cannot simply group students without regard to the characteristics that make the strategy more effective, such as heterogeneous grouping and elimination of intragroup competition.

Independent Practice/Homework

Independent practice, usually assigned as homework, has been a cornerstone of education from the earliest days of organized schooling. Proponents argue that simply learning content and concepts in whole- or small-group instruction in not sufficient. The material must be practiced independently in order for students to internalize the concepts or processes to be learned. There is a substantial body of theory and research to support this conclusion. Madeline Hunter (1984) includes independent practice as the final step of the elements for lesson design, arguing that it is essential to the learning process. Likewise, Robert Gagne (1974) emphasizes the importance of providing opportunities for learners to practice new content and skills. Marzano's (1998) meta-analysis of experimental research on instruction found that homework and practice have an average effect size of .77 (a 28-point percentile gain) and recommends that, optimally, assigned tasks should allow students to practice skills and procedures that have been the focus of recent instruction. He also found that providing specific feedback on assigned homework tasks increased the association with achievement (2003). Hattie (1992) includes homework in his list of instructional strategies associated with increased student learning (effect size .43).

While any kind of work that is assigned to be completed independently has been shown to have a positive impact on student achievement (raising the typical student from the 50th percentile to the 60th percentile), its impact becomes even greater when the independent practice is accompanied by feedback from the teacher (raising the typical student from the 50th percentile to the 79th percentile) (Walberg, Paschal, & Weinstein, 1985). Walberg and his colleagues draw these conclusions from a synthesis of 15 empirical studies examining the effects of homework on elementary and secondary students. From these studies he found an overall effect size of 0.36 standard deviations, with a greater impact from regular, as opposed to sporadic, homework assignments.

Recent research has found similar results. Singh, Granville, and Dika (2002) analyzed data from the 1988 National Education Longitudinal Study (NELS), which examined a body of representative eighth graders to determine the effects of motivation, attitude, and academic engagement on student achievement. The NELS study included 24,599 students, who completed a 45-minute survey. Singh et al. randomly drew 25% of the responses for this study (a total of 3,227 respondents). Results of the survey were analyzed based on structural equation modeling of various constructs and indicators, including science and mathematical achievement. The results of this study suggest that the strongest effect on student achievement was the amount of time spent on homework assignments.

Trautwein, Koller, and Schmitz (2002) reexamined data collected from seventh-grade mathematics students during the Learning Processes, Educational Careers, and Psychosocial Development in Adolescence and Young Adulthood (BIJU) study. A random stratified sample of school systems was drawn from those participating in the BIJU study. Two seventh-grade classes from each school system were then randomly selected (a total of 1,796 participants). Students completed a pretest to measure mathematical achievement. In addition, students were surveyed to determine the frequency and quality of homework assignments and teacher feedback. Results from this study indicate that homework is substantially related to academic achievement in mathematics and that the frequency of homework assignments is positively related to achievement, while lengthy assignments had a negative, albeit nonsignificant, effect.

Other researchers have also found that frequent homework assignments correlate positively with higher student achievement (House, 2004). In House's study, data from the 1999 Third International Mathematics and Science Study (TIMSS) were analyzed to determine the relationship between teaching strategies, such as homework, on the mathematics achievement of Japanese students. Approximately 4,660 students were randomly selected as part of a two-staged stratified cluster sampling. These students completed a survey that addressed issues such as classroom instructional activities, student background characteristics, extracurricular activities, and mathematics achievement. Questions that dealt with homework were designed to determine the frequency and quality of assignments and teacher feedback. The final piece of data collected was student performance on the TIMSS International Mathematics Assessment. The results of this study indicated that frequent homework assignments were positively related to higher mathematical achievement; however, the highest level of mathematics achievement scores was found when teachers provided in-depth feedback on assignments as opposed to being checked by classmates or by the teacher during class.

Therefore, for homework to be maximally effective, it should be assigned frequently and used as a tool to provide teacher feedback.

An interesting phenomenon that is beginning to capture the attention of educational researchers is the use of homework assignments as a means of promoting parental involvement in students' education. In a quasi-experimental study, Van Voorhis (2001) examined three sixth-grade and two eighth-grade classes in a suburban middle school implementing an interactive homework intervention called TIPS, which was designed to promote parental involvement. Students were divided into treatment and control groups. Students in the treatment group received TIPS interactive homework assignments. Each TIPS assignment included a letter to the parents explaining the assignment and the learning goals involved, and the assignment required the student to act like a scientist to complete an activity using cheap and common household goods. The assignments required students to interact with a parent or family member as a lab partner and to complete a lab report or data chart. Parents were encouraged to include observational comments on the student's participation and progress. Students in the control group completed the same homework assignments but without prompts or requirements for parental involvement. Results from this study indicated that well-designed homework assignments not only promoted active parental involvement but also positively impacted student achievement. These results are similar to those found by other studies (for example, see Balli, Wedman, & Demo, 1997; Bailey, Silvern, Brabham, & Ross, 2004; Van Voorhis, 2003).

Homework, or independent practice, even at its most basic level, can have a positive impact on student achievement. This effect can be greatly improved when assignments are designed to include specific feedback from teachers and when they promote parental involvement. Providing students with an opportunity to independently practice skills and processes is an effective means of actively engaging students and can promote metacognition as students monitor their own progress.

Conclusion

This review of the research literature has focused on instructional strategies that show positive, measurable effects on student achievement. Scholars Robert Marzano, John Hattie, and Harold Wenglinsky have analyzed much of the existing research on this topic, and additional research studies on instructional strategies were examined. As a result, two macrostrategies were identified as being effective: metacognition and active student engagement. Using one of these strategies without the other, however, may result in failure to maximize the intrinsic value of both.

Three microstrategies emerged from the research literature as being effective: higher order thinking, cooperative learning, and independent practice. Both Hattie and Marzano list several instructional strategies that may be classified as one of these three microstrategies, but unless teachers understand the macrostrategies upon which these lists are based, they run the risk of viewing the strategies as a simple to-do list and failing to realize the potential impact of the strategies on student achievement.

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